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BUREAU OF SUGAR EXPERIMENT STATIONS

BRISBANE QUEENSLAND

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Nambour. Address: P.O. Box 139, Nambour; Phone: Nambour 668.

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BUREAU OF SUGAR EXPERIMENT STATIONS
BRISBANE

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This Bulletin is an official publication of the extension service of the Bureau of Sugar Experiment Stations, issued and forwarded by the Bureau to all cane growers in Queensland.

The Cane Growers' Quarterly Bulletin

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EDITORIAL

Is Restriction Being Practised?

During the 1958 *season, when limitation on raw sugar production first became a reality, the industry was taken by surprise—not because there had been no previous warnings, but because wishful thinking created a spirit of optimism in future markets.*

It might have been anticipated that the 1958 *experience of large, unharvested tonnages in many districts would result in some reduction in crops in* 1959. *But the plantings for the latter season had already been made, and it was not until April,* 1959, *that a ministerial pronouncement made clear that sugar acquisition for that year would be limited to respective mill peaks. There had been some reduction in fertilizer usage in some districts but, overall, there was little attempt to plan crops to the market.*

However, the 1960 *position is different. There has been ample opportunity for the warnings to have been absorbed, and for restrictive action to be implemented. The* 1960 *crop will give some assessment of whether planted areas are being reduced to conform more closely to farm peak tonnages. It will doubtless take some years to get down to the level of the relatively static market quota, but the trend should be apparent in the forthcoming season.*

Research Seminars in North Queensland

By J. H. BUZACOTT

Two of the great difficulties which face scientists working in remote areas are lack of library facilities and lack of contact with other scientists. In the city, public and departmental libraries, and those of the universities and scientific societies, provide the literature so necessary to the scientific worker, whilst regular meetings of such societies as the Royal Society, Australian Institute of Agricultural Science, Entomological Society and many others provide the necessary personal contacts. In the more remote field station the need for scientific literature is met to some extent by establishing a small library of essential books at the station and freely circulating periodicals and books from a central library in the headquarters of the institution which is usually in a capital city. Personal contact between scientific workers is not so easily arranged.

Following the establishment, in 1957, of the Tobacco Research Institute at Mareeba, on the Atherton Tableland, Dr. O. H. Frankel, Director of Plant Industry in the C.S.I.R.O., and the late Mr. A. F. Bell, formerly Under Secretary for Agriculture and Deputy Chairman of the Sugar Experiment Stations Board, decided it would be of great value to agricultural scientists in far North Queensland if regular meetings were arranged between research officers of the Department of Agriculture and Stock, the Tobacco Research Institute and the Northern Sugar Experiment Station.

Fig. 60—Research Officers in North Queensland listening to a seminar on cane breeding at Meringa.

The idea was followed up and, towards the end of 1957, the first Research Seminar was held. It was arranged to hold the seminars alternately at Meringa and Mareeba as the establishments at these two places

have the necessary facilities. It was also decided to hold them at two-monthly intervals since that period achieves the purpose of maintaining regular contact without unduly interrupting the work of the personnel concerned. At each seminar, which is for half a day only, two lecturettes are given and, as far as possible, it has been endeavoured to devote one to a general subject of wide interest and the other to a purely technical dissertation often of a high degree of complexity. The reason for having these two types of lecture during the one session is that, since so many different branches of science are represented — entomolgists, pathologists, physiologists, agronomists, geneticists, to mention a few — it is obvious that the purely technical lectures can often only be fully understood by relatively few of those present. However, anyone can understand and appreciate the general subjects and, in this manner, interest at the meetings is kept from flagging. Topics of general interest which have been presented at recent seminars include "Water from the Tinaroo Dam", "Possible Agricultural Developments in the Cape York Peninsula" and "Some Aspects of Tobacco Research Overseas" whilst talks of a more specific nature include "Plant-Soil Nitrogen Relations of Tobacco", "Cercospora Leaf Spot of Bananas" and "Funnel Ants in North Queensland." The July 1959 meeting was devoted to a lecture and practical demostration of the latest methods used in cane breeding at Meringa. This was presented when the sugar cane cross-pollination season was at its height.

The seminars have had their desired effect. They have resulted in a close contact between scientists working on similar problems but in different crops; they have enabled the younger members of the group to gain some experience in lecturing; and, above all, they have to a large extent destroyed the isolation which is so often the lot of the agricultural scientist on a field station.

Good News on Urea

A recent announcement from Federal Government sources made clear that import licencing restrictions on a wide range of materials would be lifted; the materials included the fertilizer urea.

The statement is understood to mean that whereas, previously, urea could be imported only by obtaining an import licence—which was limited to a certain tonnage—it can now be imported without any licence being obtained.

If this is correct the way is open for cane growers to obtain their full requirements of urea without rationing or restriction.

The latest price list issued (Brisbane prices) shows urea at £60 per ton and sulphate of ammonia at £32 per ton. If the sulphate of ammonia price be taken as the basis for calculation, then urea would be worth £70 per ton (calculated on a 46 per cent. nitrogen content.)

There would be further savings in freight from Brisbane, and in distribution on the farm, so the use of urea for top-dressing cane is a particularly attractive proposition.

However, to ensure the saving is made, the quantity of urea applied should be a little less than half of the quantity of sulphate of ammonia which would otherwise have been used. In other words if 240 lb. per acre (a bag and a half) of sulphate of ammonia were normally used, then apply only 110 lb. of urea.

Poor Ratooning Investigations, Bundaberg 1955-1960

By R. B. MOLLER

Occasional poor ratoons had been recorded in the Bundaberg district prior to 1950. During the early 1950's the increase in poor ratooning, and its persistence on several farms, were responsible for the commencement of full scale investigations into the problem. These commenced in July, 1955.

Q.50 occupied the major part of the plantings in that area at that stage. Consequently, more damage could be expected with those varieties.

During the autumn and spring of 1955 four varietal resistance trials were established on sites with a poor ratooning history. Twenty-four varieties of which 13 either were, or have

Fig. 61—Sieving soil from soldier fly infested stool. Larvae are retained on the sieve and most soil is washed through.

Prior to this date, preliminary investigations by various officers of the Bureau of Sugar Experiment Stations revealed that (1) poor ratoons were more frequent on those farms on which green manure crops were not grown and (2) the varieties C.P.29-116 and Q.50 were the most frequently affected; C.P.29-116 and

since become, approved varieties were tested. No clear cut results were obtained. All varieties ratooned poorly in one trial or another either as first or as second ratoon crops. The overall observation was that under similar conditions the more vigorous ratooning varieties eventually produced more satisfactory stands

than the slower and weaker ratooner. This has since been borne out by observation over several years.

N.Co.310 is probably the most reliable ratooner in the poor ratooning areas, but it has been known to fail completely. In the presence of the poor ratooning influence, such factors as early harvest and unfavourable weather conditions at harvest have resulted in the development of poor ratoons. If cut under more favourable conditions the ratoons would have been normal.

Applications of several other materials, including 2,4-D, copper sulphate and the fungicides, Manam, Puraturf, Folisan and Botrilex were also made to freshly cut stubble. Several of these materials were also applied as fallow dressings and worked into the soil. No improvement was achieved.

The fertility angle was not overlooked even though ratoon failures occurred on all soil types including rich river flats and volcanic soils. Heavy dressings of potash, phos-

Fig. 62—Bundaberg Disease Control Board members inspect soldier fly experiment. Immediately in front of figures is a non-treated plot (a ratoon failure), while immediately behind them is a plot treated with BHC (a successful ratoon).

Prior to the establishment of varietal resistance trials, an attempt had been made to stimulate development of ratoon shoots by Aretan treatment of stubble as soon as possible after harvest. This work was continued during the 1955 and 1956 harvest periods. While some stimulation was achieved this was virtually limited to the top two buds on the stubble. The difference between treated and untreated gradually disappeared with no difference between final stand.

phate and magnesium sulphate, as well as the trace elements, zinc, copper, boron, manganese, iron and molybdenum failed to give any response. Lime and sulphur were used with the idea of influencing the soil reaction.

Extensive use of mill by-products, particularly molasses and filter mud was made. Two trial areas with bagasse were also established. Both molasses and filter mud promoted plant vigour, but they did not affect ultimate ratooning.

During the 1956 harvest several hormone type sprays were used in an attempt to break top dominance in mature stalks and so allow development of the lower buds. To this end ethylene chlorhydrin, Phyomone, Carpamone, 2,4-D, T.C.A., transcinnamic acid and maleic hydrazide were applied. They were also sprayed on freshly cut stubble, but no ratooning improvement was obtained by any treatment.

The first exploratory trials with the fumigants, EDB, DD, carbon bisulphide and chloropicrin and the insecticides, BHC, aldrin, dieldrin and chlordane were made about this time.

Towards the end of 1956 soldier fly larvae were located in association with poor ratooning fields in the Fairymead area. Since then they have been found on many South Kalkie farms and more recently, their presence on a number of farms scattered throughout the Bundaberg-Gin Gin-Isis area has been confirmed. This association does not extend to all poor ratoons, but in the large majority of cases it is so. In this connection the variety Q.50 seems to be one of the true exceptions in that very frequently no larvae are associated with its ratoon failures.

At the present time it is not clear how many larvae are required to cause poor ratooning. On one farm in which the ratoon varied from apparently normal to an absolute failure the larval population for an area three feet across the row, one foot along the row and nine inches deep was,—

Apparently normal stool	17 larvae
Poor stool (a field of this type would be a plough-out)	25 larvae
Very poor stool	87 larvae
Completely failed stool	238 larvae

The variety was N.Co.310 third ratoon. In many poor ratooning fields casual field examination commonly yields 50, 100 or more larvae per stool. Although 17 larvae, in the case quoted above, still allowed apparently normal development, as few as three larvae have been found in other cases where a stool failure has occurred.

Since the establishment of soldier fly as a probable factor in poor ratooning, most trials have been designed for its control at the expense of other less promising avenues of investigation. These trials have been with BHC, dieldrin, aldrin and, to a lesser extent, chlordane. Methods of application have varied widely to include (1) broadcast dressings to fallow land either ploughed under or disced in, or in combination, and (2) drill applications at planting time and at the half-open drill stage. Current insecticide trials using these methods cover at present an area in excess of 30 acres.

To date the only trial in which any ratooning response has been obtained was at Black Bros.' farm, South Kalkie. Here BHC at 4 lb. g.i. and 8 lb. g.i. per acre, applied as a broadcast dressing, grubbed in, and left undisturbed for four weeks prior to planting produced a normal first ratoon when the field was cut approximately eighteen months later. Aldrin at 4 lb. active ingredient per acre, BHC at 2 lb. g.i. per acre and dieldrin at 2.4 lb. active ingredient per acre were not superior to the control.

The insecticides were applied in late May during what may be the emergence, egg-laying and hatching periods in the life cycle of the soldier fly. This appears to have been the critical factor in this trial. Similar dressings applied during the July-September period on other farms did not improve ratooning. This was also the case in April-treated fallow. However, this latter field was planted shortly after the insecticides were applied and before fly emergence commenced. It is possible that the unprotected sides of the drills allowed re-establishment of larvae.

In Black's trial one stool from each of the 4 lb. and 8 lb. g.i. BHC plots, the aldrin plot and adjacent controls were examined for larvae. None was found in the BHC plots, but 48 and 21 larvae per stool were taken in the controls and 51 larvae from the aldrin treated plot. The volume of soil examined for each stool was 18 inches x 15 inches x 12 inches deep.

The next phase of the programme is a fallow or young plant treatment of likely poor ratooning fields in the autumn. BHC at 4 lb. and 8 lb. g.i. per acre will be applied in strips using a boom spray. Since there is a likelihood that fallow treatment will not afford protection of the second ratoon crop, provision will be made for booster dressings to be applied after the plant cane has been harvested. Various methods of incorporating the insecticide into the soil surface will be investigated, and at the same time an attempt will be made to determine how long this blanket covering of insecticide must be left undisturbed in order to produce the best results.

Medical Facts About Sugar

The following paragraphs are copied from a publication recently published by the British Medical Association.

Those fortunate enough to attend the final days of Wimbledon may have noticed that many players, in between sets, go to the table under the umpire's chair, put something in their mouths and swallow it down with a draught of water. In case you don't know what that something is, I will tell you. It is lump sugar.

Sugar is a provider of instant energy and is an essential part of our diet. As soon as sugar meets our digestive juices, it undergoes a rapid reaction and a series of changes, the end result of which is the production of energy.

Sugar is therefore a vital commodity to anyone who requires energy, and that includes everybody to a greater or lesser degree. Obviously the more energy you require, the more sugar you need. The docker unloading ships, the labourer working on the roads, the athlete running one hundred yards, must have large quantities of energy to do their work and large amounts of energy require large amounts of sugar. The busy housewife, the factory worker and the office girl also require energy, but to a lesser degree.

Sugar has been accused, often quite wrongly, of causing obesity. Those inclined to put on extra weight do so because they are eating too much of everything. Moderation is the keyword need, and they should resort to a balanced diet on the advice on their doctors. But it is of no use at all to stop eating just one particular food in the hope that you will lose weight. Once you have lost weight, you must still keep to the diet, or it will return far more quickly than you lost it.

The belief that sugar is bad for children's teeth just isn't true. After two years' tests on children in London, Liverpool and Sheffield, the Medical Research Council came to the conclusion that eating sugar does not cause bad teeth. Doctors taking part in the investigation fed 265 children, aged two to fourteen, on diets containing as much as 2¾ lb. of sugar a week. Their teeth decayed no faster than the children whose diet contained only eleven ounces of sugar a week. The important thing is to see that children clean their teeth regularly after meals and to keep them right off sticky and clinging sweets.

Nut Grass

By G. A. CHRISTIE

Nut grass is a very widely distributed pest of cultivated areas, thriving in both tropical and sub-tropical conditions, but it is incorrectly referred to as a grass since it belongs to the botanical family commonly known as sedges. It is a perennial plant which produces numerous egg-shaped tubers from which new plants develop. Leaves, which are bright green and somewhat waxy, form in a cluster at ground level and are narrow, tapering to a fine point. The plant produces flowers and sterile seeds in clusters on four or five slender branches at the top of a single stalk.

Within the family of sedges, there is a large number of species, practically all of which produce the characteristic tubers, and so the entire group is commonly known by the collective name of "nut grass", but there is considerable variation in their reaction to control measures. Some species are easily eradicated by the use of common hormone weedicides while others are completely destroyed by normal field cultivation. The persistent species generally encountered in cane land is known botanically as *Cyperus rotundus;* it is very difficult to eradicate, and is readily spread by cultivation when the tubers are moved to new locations with tyne implements.

While identification is useful, measures to eradicate or control nut grass are of prime importance to practical cane growers. This subject has been dealt with previously in issues of the Cane Growers' Quarterly Bulletin and in other publications, but results of recent efforts to eradicate this pest on the Lower Burdekin Experiment Station may be of value in some localities.

Some of the Experiment Station fields had shown infestation of nut grass in patches for many years, and early attempts to eradicate this pest by spraying with 2,4-D proved ineffective.

Small trial areas using the fumigant, methyl bromide, indicated that a complete eradication could be obtained provided soil conditions were suitable for the efficient penetration of the fumigant. In 1958, an area totalling 38,337 square feet (approximately nine-tenths of an acre) in two of the Station fields was treated and the small regrowth, subsequently retreated, was due to the initial treatment being carried out under unsuitable conditions. During the latter half of 1959, other patches totalling approximately 94,000 square feet (approximately 2.16 acres) in another field, has shown excellent results following the methyl bromide fumigation.

While complete eradication is possible with this method, costs are prohibitive under normal farm conditions, but the method is quite a practical one for treating small patches on farms where nut grass is not widespread. Prior to using the fumigant, soil has to be loosened as deeply as possible, preferably to ten inches or more, either by hand forking or grubbing, care being taken to prevent the movement of nut grass tubers when loosening the ground for treatment. A trench about six inches deep is dug around the perimeter of the area to be treated and this area is then covered with a light plastic sheet. The sheet should be raised from the soil to allow free movement of the fumigant, and while inverted bottles are sometimes recommended, excellent results have been obtained using bags filled with cane trash or grass. The perimeter is then sealed by placing the edges of the sheet in the trench and filling the trench with soil. Liquid methyl bromide which immediately changes to gas at atmospheric pressure, is introduced under the plastic sheet through tubes, care being taken to

ensure that the liquid does not come in contact with the plastic sheet, since this will cause a rapid deterioration of the sheet. The quantity of fumigant may vary with different soils, but tests on a sandy loam have given complete control at 1½ lb. per 100 square feet of area. This amount would probably have to be increased on heavier soils and might be reduced on sandy areas.

It may be found that some locations make the use of plastic sheets impractical for covering patches of nut grass. Such difficulties were experienced on the Lower Burdekin Sugar Experiment Station when nut grass in fence lines and in the mill tramline would have provided sources for re-infesting the fields from which the weed was eradicated. Successful eradication appears to have been effected in these places by the use of heavy applications of 2,4-D powder. This weedicide applied at the rate of 2 lb. per 100 square feet to the soil surface effectively sterilizes the area on which it is placed. Obviously such treatment is impractical for land under cultivation and, here again, the cost of material is rather high, and the eradication programme outlined in the foregoing could be used effectively only when the infested area is limited.

Where large areas are infested, as often occurs, particularly on alluvial flats, eradication may be impractical, but under these conditions, reasonable control can be effected by cultural methods. In a dry part of the year, death of the tubers will result if they are exposed on or near the soil surface for about two weeks in warm weather. Regular deep cultivation of fallow land tends to bring more and more tubers to the surface where they are dried and destroyed. The destruction of shoots at the same time prevents the building up of reserve foodstuffs in the tubers, thus reducing the number of tubers capable of producing new plants.

In wet weather, however, when cultivation is impossible, a very rapid regrowth develops, and this may be kept in check to some extent by shading the soil with a cover crop, preferably a rapidly growing legume, prior to the planting of cane. Cane tends to produce quite an effective shading to check further development of nut grass, and when cane stools are finally ploughed out, there is usually only a sparse infestation of the weed. However, unless cultural control is practised, nut grass rapidly becomes re-established during the fallow period between crops.

If allowed to regenerate unchecked during the fallow period, nut grass probably has its most detrimental effect while the young plant crop of cane is germinating. Cultivation for its control at this stage can often result in plants being dislodged or disturbed in the soil, so affecting the final strike. The hormone weedicide 2,4-D may be used to advantage by spraying the cane drill after a complete stand of the weed has become established. It is important that such spraying should not be carried out too early since the weedicide will have no effect on shoots appearing through the soil after spraying. By applying the weedicide to the drill, about one pound per acre of 2,4-D will suffice, for approximately one fourth of the surface area of the field receives the spray. Because of the waxy nature of the leaf, nut grass is difficult to wet and a suitable detergent or wetting agent should always be used. Such a spraying will often keep the weed in check for periods of four to eight weeks.

Acclimatization and Deterioration of Varieties

By J. C. SKINNER

The performance of a new variety often improves during the first few years after it has been approved, and people say it has become acclimatized. Later on, its performance may decline and it is said to deteriorate. The words "deterioration" and "acclimatization" are often misleading when applied to sugar cane because the variety itself does not change.

Commercial sugar cane varieties are propagated by stem cuttings. This vegetative reproduction increases the number of plants of a variety without altering its inherited characteristics. If a variety differs in performance in different parts of a field, or if its performance changes over a period of years this is due, not to any change in variety, but to changes in its environment (for example rainfall, growing conditions, soil fertility, and diseases).

Disease is probably the main cause of deterioration. Virus diseases such as ratoon stunting are especially important because they are transmitted through the cuttings. A variety infected with ratoon stunting disease "deteriorates," but the variety itself does not change, as can be seen when the disease is cured by hot water treatment.

A sugar cane plant, growing under dry conditions, becomes acclimatized by producing a larger root system. However, cuttings from this plant are not likely to have any increased capacity to produce large root systems. For this type of acclimatization to affect a sugar cane variety it is necessary to assume that acquired properties are transmitted through the cuttings and the available scientific evidence indicates that this does not happen.

The most probable explanation for acclimatization of a variety is as follows :—When a new variety is approved it has been tested on only a very small proportion of the mill area. After it is approved it is grown extensively and, after a few years, farmers make sure it is only grown on the most suitable fields. Often it performs better on these fields than it did on the less suitable fields where it was growing when first approved.

The opposite situation can also occur. A variety may be selected under conditions which suit it very well, and it doesn't perform so well when it is grown on other farms. This means that the variety is not accepted by farmers and we don't hear any more about its "negative acclimatization."

If a new variety has unusual cultural requirements, such as earlier planting or additional cultivation, farmesr learn to handlie it properly, and it performs better. Acclimatization is most probably due to the provision of more suitable growing conditions and methods, and not to any change in the variety.

If acclimatization and deterioration were caused by permanent changes in a variety it would not be possible to do anything about them. Since they do not involve any inherent change in the variety, a farmer whose cane suddenly deteriorates in performance should look for the real cause of the trouble and obtain expert advice, and he should not persist with an unsuitable variety under the false impression that it will become acclimatized.

The Rotary Slasher — A New Machine for Cane Destruction

By S. O. SKINNER and I. T. FRESHWATER

With the surplus production of last year, many growers in the far north were faced for the first time with the problem of mass crop destruction.

For the complete eradication of a crop and stools for fallowing, various methods employing heavy off-set bumper discing, rotary hoeing, bulldozing and ploughing were used in the Innisfail and Tully areas with satisfactory results. However, for the destruction of the crop only, to allow of ratooning in preference to standing over, the problem of destroying the stalks sufficiently to safeguard against subsequent cultivation and harvesting difficulties caused greater concern.

Pioneered by a large grower, Mr. T. Elston of Lower Tully, the introduction of the Arthur rotary slasher, a machine regarded primarily for the destruction of brush and excess growth in pastures, proved most interesting.

The slasher is constructed in three sizes, consisting essentially of four adjustable but fixed blades attached to a revolving ground plate and driven from the power take off of a tractor. The accompanying photographs and remarks apply to the large size, which is considered to require a tractor of 45 horse power or more. Quick adjustments allow for a width of cut of up to seven feet, while extra blades may be added for light grass work to increase the swathe to nine feet.

After the initial introduction, several further machines were rapidly acquired and all were used extensively towards the close of the season. The crops slashed were up to 40 tons per acre with one of 60 t.p.a.,

Fig. 63—The spectacular disposal of a 35 ton per acre crop of Badila after two washings by the Arthur rotary slasher.

—Photo I. Freshwater

Fig. 64—The slasher in operation in a light crop of Badila. This block was allowed to ratoon through the cane mulch.
—Photo S. O. Skinner

Fig. 65—A satisfactory young third ratoon crop of Badila five months after slashing and volunteer ratooning. The protective mulch kept the ratoons virtually weed free.
—Photo S. O. Skinner

and were principally of the varieties Badila, Pindar, Vidar and Q.57. They were slashed mainly in the green state, without any serious clogging from the mass of material.

In our photograph may be seen the spectacular "end product" of a 35 tons per acre crop of Badila ratoons where little more than mulch was left. In this instance two slashings were given.

ding. To overcome this. operators found it desirable to perform a first slash about one foot high, and follow with another at ground level.

The rate of operation was one acre per hour, giving the relatively fast coverage, for a single slash, of over eight acres per day.

Differing from most chopping implements, the Arthur machine not

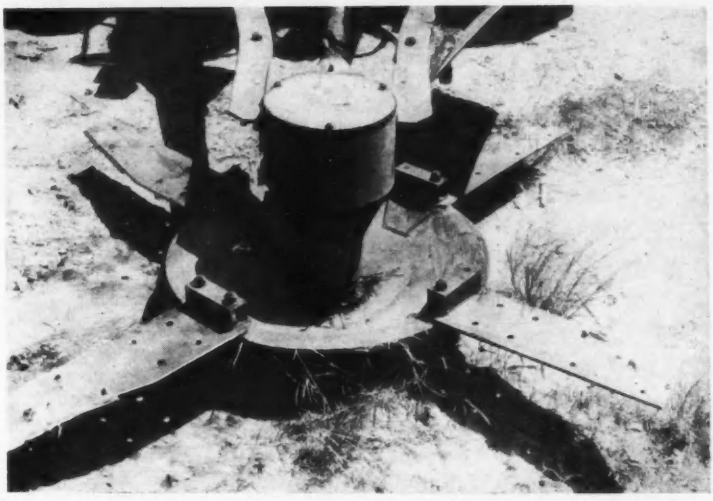


Fig. 66—A close-up of the slasher. —Photo I. Freshwater

To meet all eventualities, three methods of operation were applied:—

(a) With light crops and level drills, a single slashing with normal forward driving of the tractor (the slasher being at the rear) proved quite adequate.

(b) In heavy crops, two slashings were favoured by most operators for thorough shredding, the first reversing into the work i.e., the slasher preceding the tractor. Driving in reverse was not difficult.

(c) In instances of highly hilled-up ratoons, the cane stalks tended to fall into the interspace hollows, and escape thorough shred-

only cut but, particularly with the second slashing, gave a pronounced shredding of the pieces of stalk and tops. This provided ideal material for a surface mulch or for burning after it had dried out sufficiently.

A considerable amount of ratooning was performed by utilising the attractive dense mulch, as illustrated in Fig. 64 as a complete blanket against weed growth. The same field, carrying a ratoon crop, was photographed five months later and is shown in Fig. 65. The crop is third ratoon Badila.

While several makes of slashers are known to be marketed, the "Arthur", possibly because of its

high clearance and absence of a congesting guard, other than a small shield to protect the driver, proved particularly suitable. The cost was £240 landed in Tully. While this may be regarded as expensive for a machine that might be used for only a brief period for crop destruction, its introduction as a new implement to the cane farm is nevertheless of considerable interest; other uses and advantages might well follow. Last year for instance, almost ceaseless rain to the middle of September made planting on rich alluvial soil most difficult. Without the slasher Mr. Elston would have had to perform the bulk of his planting extremely late or risk standing over a large per centage of his area. Instead, with the slasher to facilitate cheap ratooning, he was able to maintain his nett assignment by a smaller planting and a more extensive ratooning. In addition, owners anticipate extensive usage of the machine for the clearing of headlands, creek banks, and other waste farm areas.

Weed Control — The Value of Correct Identification

The absence of livestock on cane farms is becoming more noticeable every year. The growth of grass and weeds on waste land is increasing, not only in area and quantity, but also in variety. Many species of plants can be eradicated or controlled by continued grazing; this no doubt has happened in the past when all waste land, including both gullies and unassigned areas, was fenced off as permanent grazing paddocks. In addition, weeds are often introduced from other districts or even from other countries; giant sensitive weed is an example of this type.

Farmers are now finding it necessary to devote more time to weed control on headlands, drainage channels and gullies. With this increased attention, the presence of unknown weeds is being noted, and Bureau officers are regularly called upon to advise on control measures. If the correct name of the weed is known, it is often possible to give immediate advice as to its control, or to find out how other people have controlled it. Correct identification is thus an important step in weed control.

Recently a Cairns district grower requested identification of a vigorously growing vine found in a gully which had previously been used as a grazing paddock. The vine was capable of extensive reproduction from tuberous growths found on all the older stems. When forwarded to the Government Botanist it was identified as Lamb's Tail (*Boussingaultia basselloides*). Although it appeared aggressive in nature, the Government Botanist stated, "It is a naturalized plant which usually colonizes damp waste places. It is a vigorous grower but does not appear to be aggressive."

It is advisable in cases where unknown weeds are becoming a nuisance to contact the local Bureau Officer who may be able to identify them immediately, and assist with their control. If he is unable to recognise the weeds he will collect and forward specimens to the Government Botanist for positive identification and information available for their control. There is a bewildering array of chemicals on the market for weed control and many of these chemicals are selective in nature. Consequently it is essential to use the right weedicide for control of a plant, otherwise both money and valuable time may be lost in ineffective spraying.

G.H.W.

Fig. 67—This is one of Queensland's earliest sugar mills—Dart's sugar mill at St. Lucia, on the Brisbane River. Reproduced from a painting by courtesy of Mr. D. I. Watt and Mrs. V. M. Holyoak, Brisbane, and the National Bank of Australasia Ltd. (Date: about 1885).

Fig. 68—Remains of the Doolbi Sugar mill near Childers.
—Photo N. McD. Smith

Fig. 69—**Erect Q.66 and lodged Badila of same age on a rich Tully farm.**
—Photo S. O. Skinner

Fig. 70—**The site of the Bureau's seedling plot at Bartle Frere in the Babinda district.**
—Photo J. H. Buzacott

Fig. 71—An aerial view of the Bundaberg Sugar Experiment Station.
—Photo N. McD. Smith

Fig. 72—Erecting a wind barrier during transplanting of seedlings from flats to pots at Meringa, 1959.
—Photo J. H. Buzacott

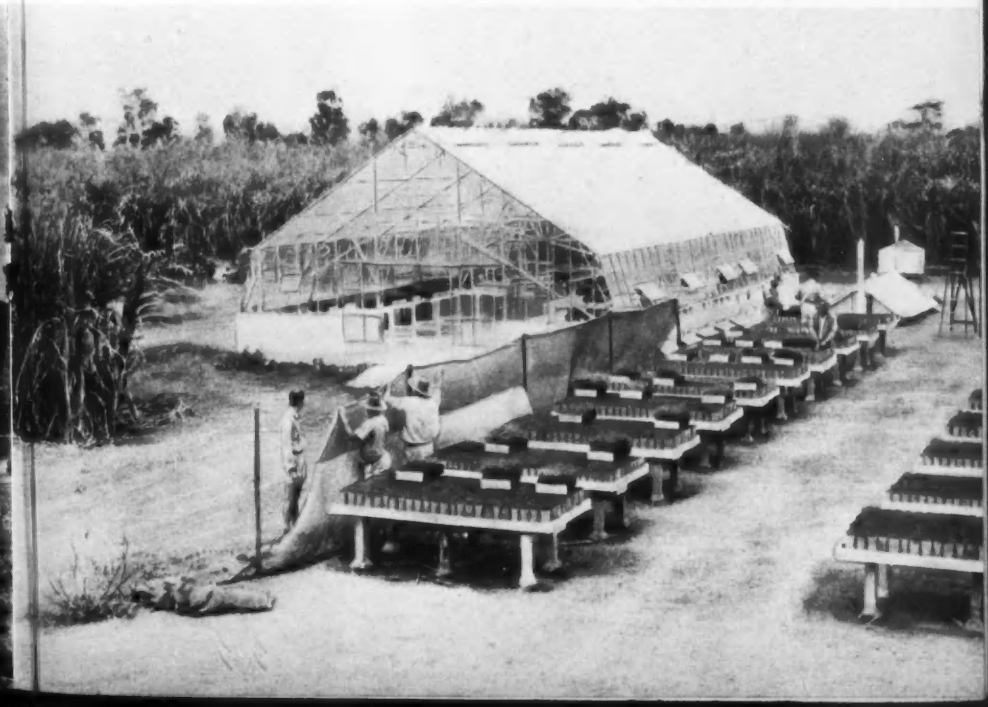


Fig. 73—Looking over a block of original seedlings on the Meringa Experiment Station.
—Photo J. H. Buzacott

Fig. 74—Q.47 plant cane, twelve months old, on the Bli Bli flats, Maroochy district.
—Photo Department of Agriculture and Stock

Badila Attains Retiring Age

By S. O. SKINNER

Late last year, a unique monument, erected in Innisfail by the Italian Community as a Centenary year gesture to the pioneers of the sugar industry, was unveiled by the Premier of Queensland (the Hon. G. F. R. Nicklin).

The monument is shown in the accompanying photograph. Surrounding it is a low fence of metal stalks of "Badila" complete in detail with eyes, nodes, and wax bands. The variety was a logical choice for the purpose, even though it was not known as a variety during the earliest days of sugar cane settlement. However it did play a leading part during the developmental period of many northern mill areas. This year, on the 18th December, Badila will celebrate the sixty-fifth anniversary of its finding and despatch to Queensland from the wilds of New Guinea.

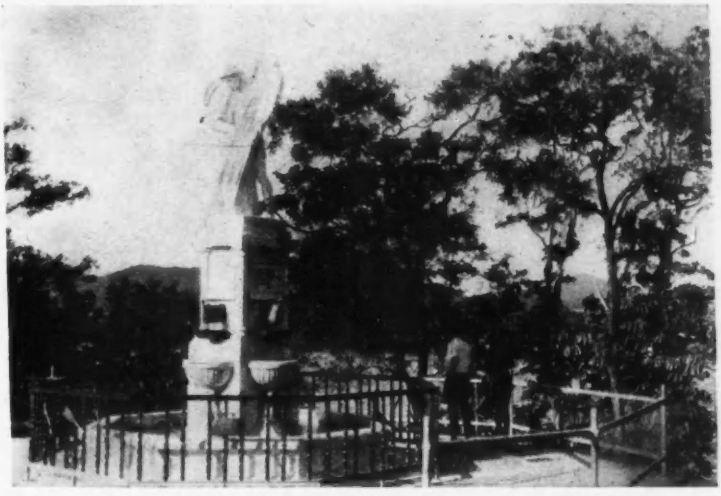


Fig. 75—The Centenary year monument erected in Innisfail by the Italian community to the pioneers of the sugar industry.

Photo S. O. Skinner

A flash back to an article in the October, 1947, issue of the Quarterly Bulletin reveals the many trials that the expedition by the Queensland Department of Agriculture and Stock experienced.

On the debit side of the expedition the records show that the chartering of a nineteen ton cutter from Burns Philp and Company, for an anticipated two months, cost £20 per month. And, for bartering with the natives, the public purse had to stand such items as 32 lb. of assorted beads at one shilling per pound, gilt chains at two pence each, tobacco, matches, pipes and cloth.

On the credit side, the worth of the cane to the Queensland industry needs little telling. It is sufficient to recall the many years Badila held the crown as the leading cane of the State, while for much the same period it was the premier variety in practically all mill areas of the North.

In 1959 Badila had fallen to seventh place in importance but, despite having reached the accepted retiring age of 65, it will be with this industry for many years yet.

Influence of Filter Mud on Seed Germination

The effect of organic matter applications to the soil in the delaying or prevention of seed germination has been noted by many agricultural workers. Recent observations in a filter mud trial on the Central Sugar Experiment Station have indicated similar occurrences.

Late in October, 1959, filter mud was applied to various plots interspersed among other plots which did not receive filter mud. After ploughing and disc harrowing, the whole area was planted with velvet beans three weeks later. A uniform germination of the legume occurred but it was soon apparent that weed seed germination was delayed in the plots previously treated with filter mud. Early in January, 1960, the filter mud plots were sharply defined in the trial area. In the absence of filter mud there was a heavy growth of grass, predominantly barnyard millet (*Echinochloa crus-galli*), while in the treated plots the grass seeds which had eventually germinated, had made little growth prior to seeding. The legume had grown equally well on both treated and untreated soils.

The reason for the delay in germination of weeds in the soil treated with filter mud is probably due to unfavourable soil-air conditions ininduced by initially high filter mud decomposition rates. When organic matter is incorporated in the soil there is a rapid rise in the carbon dioxide level and a corresponding decrease in the oxygen level of the soil air. The exposure of seeds of some plants to high carbon dioxide concentrations has been reported to delay germination for a long period after the removal of the carbon dioxide. Similar effects have been observed by reducing oxygen levels.

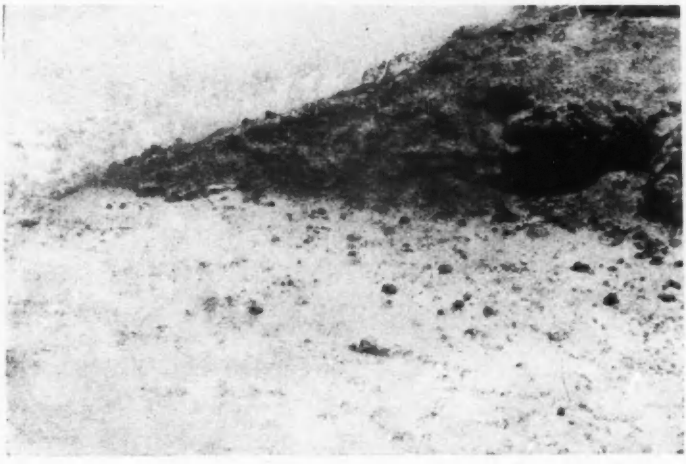


Fig. 76—Portion of filter mud heap was removed two months ago. There is still a complete absence of seed germination.

A more marked example of delayed seed germination is also apparent on the sites of filter mud storage heaps. Following the removal of the heaps weeds have not yet germinated in a period of eight weeks although climatic conditions have been conducive to rapid weed growth. If

allowed, weeds which spread by runners and which are already established outside these sites will encroach on the areas, indicating that they are able to support plant growth.

G.C.B.

Visitors from Abroad

In recent years the Northern Sugar Experiment Station has become a favourite visiting spot for important visitors to the Cairns district. In particular there has lately been a succession of visits from high-ranking foreign officials such as Ambassadors, High Commissioners and Trade Commissioners. Apart from the attractive surroundings of the Experiment Station at Meringa, with its picturesque backdrop of mountains, these visits have an important practical value because the official representatives of other countries are thereby enabled to obtain a clear and accurate perspective of the agricultural side of the sugar industry and also of its many problems, with the minimum of travelling. This is important when the whole tour of a district as large as Cairns has to be compressed at most into two or three days.

Sometimes the visitors are accompanied by their wives and sometimes also by their children, and Mr. and Mrs. Bates have acted as hosts at Meringa to quite a number in the past few years, including such diverse representatives as His Excellency the Ambassador for France, His Excellency the Minister Plenipotentiary of Thailand and the High Commissioners for India, Malaya and Indonesia. The most recent of these visitors was the High Commissioner for South Africa, Mr. A. S. Hamilton, and his wife, and the accompanying picture shows Mr. Bates describing to Mr. and Mrs. Hamilton some experimental work in progress in the Meringa glasshouse. J.H.B.

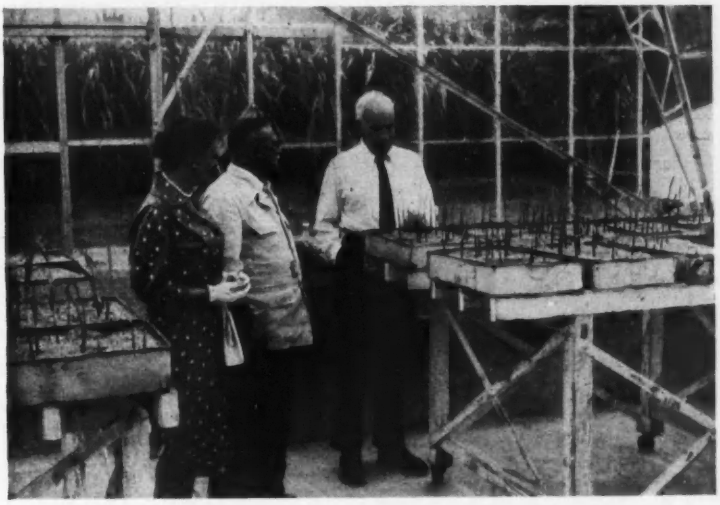


Fig. 77—Mr. and Mrs. A. S. Hamilton inspecting glasshouse work at Meringa.
Photo: J. H. Buzacott

A Basal Stem and Root Rot of Sugar Cane

By B. T. EGAN and D. R. L. STEINDL

During the past two or three years a disease affecting young plant cane has been observed in several cane growing areas of Queensland. The Lower Burdekin has been the chief area affected, but it has also been recorded from the Plane Creek, Tully, Innisfail, Babinda and Mulgrave areas.

Diseased plants can be easily pulled out of the ground since the root system is poorly developed, and those roots which have developed are usually rotted. The underground parts of the leaf sheath are enveloped in a white fungal growth and, when they

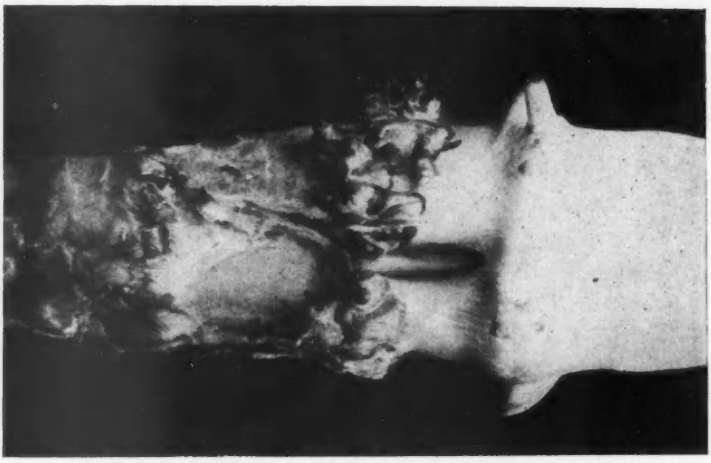


Fig. 78—Basal portion of a cane stalk showing rotting of roots and stem.

Diseased stools are smaller than normal and are characterised by their stiffer leaves which give a fan-like appearance, by the premature death of the older leaves due to a rotting of the below-ground portions of the leaf sheaths, and by the slow development of secondary shoots. Frequently, the leaves of the more severely affected plants develop whitish stripes which are quite narrow, regular in outline and follow the vascular bundles. The stripes vary considerably in length, and may extend almost the whole length of the leaf, but they usually commence at the midrib. Some leaves show only a few stripes, but others may be severely striped.

are removed, it can be seen that the young buds and roots have also been attacked. The roots are severely stubbed and many show signs of decay.

The stem tissue is also attacked, around the node in particular, and areas of dead tissues are seen extending onto the internodes. The white fungal growth can also be seen on the stem and roots.

Diseased plants are usually scattered throughout a field, but seem to be more concentrated in certain patches where conditions for growth are not as good as in the remainder of the field. When soil moisture is at

a favourable level symptoms are not so pronounced.

Although some plants are killed by the disease, observations to date indicate that the majority of them recover sufficiently to produce a crop of cane. The recovered stools tiller close to the surface of the soil because the lower buds have been killed, and this might influence their ratooning capacity.

The main varieties affected have been Trojan and Q.67, but the disease has also been recorded in Badila, Q.63 and L.622, and it is probable that other varieties would be attacked.

The cause of the disease appears to be a white fungus which has been isolated consistently from affected tissues. This fungus has reproduced the disease when healthy plants have been inoculated with it in the glasshouse. The fungus has not yet been identified since it has failed to produce spores in culture, but further work is being carried out to confirm its pathogenicity and establish its identity.

Mosaic Disease Must Be Watched

A recent discovery of several fields of cane heavily infected with mosaic disease in the Booyal area emphasizes the need for regular inspections for cane diseases on every farm. Within the past few years minor outbreaks of downy mildew and Fiji disease have been quickly eliminated because they were located before these diseases had become well established.

In the particular case in point mosaic disease had been overlooked on a small group of farms with the result that this disease had increased to alarming proportions. The farmers concerned had failed to recognise the disease and consequently diseased cane was being propagated on these farms, and in some cases diseased plants had been sold to neighbouring farmers. Mosaic-diseased cane had also been hot-water-treated for the control of ratoon stunting disease, and propagated for distribution to other growers.

The variety mainly affected in this particular outbreak was Q.50, but the disease had also spread to several other varieties. Symptoms in Q.50 are not always easy to detect, and it is understandable that they could be missed by a farmer not familiar with the disease. However it is in the interest of all cane growers to make sure that their crops are free from disease because, apart from the losses in yield that are caused by disease, it is an offence to plant, or sell for plants any cane which is diseased. Growers should therefore, have all cane that is to to be used for plants carefully inspected by the Cane Pest and Disease Control Board inspector in their area; normally the inspector will visit every farm during the year, but if he fails to do this the growers concerned should request that regular visits be made. If this is done it is not likely that the disease position will ever get seriously out of hand.

D.R.L.S.

Weedicide Damage in Ratoon Trojan

By L. S. CHAPMAN

It is of interest to record the damage which can be inflicted on a crop of young cane by the application of excessive amounts of weedicides.

On a farm in the Giru area a block of Trojan ratoon cane was found to be infested with Johnson grass. In an effort to control the pest in this block, the Johnson grass was sprayed with 10 lb. per acre of dalapon. At this stage the cane was 18 inches high overall, and was not successfully competing with the Johnson grass. It was observed that, a week after spraying, the cane yellowed for a period of two to three days, and then regained its normal colour again.

As the initial application of 10 lb. per acre of dalapon did not control the Johnson grass, a further application of 5 lb. per acre of dalapon plus 7 lb. per acre of TCA was applied. It has been established overseas that 15 lb. per acre of dalapon plus 7 lb. per acre of TCA is the maximum amount of these weedicides which can be applied to one crop of cane without causing damage to the crop.

This second application, applied two and a half weeks after the first, had an immediate effect on the crop of ratoon Trojan. Two weeks after the second application the cane had yellowed and was severely checked. The extremities of the leaves had dried, and growth of the plant had stopped.

Seven weeks later an occasional shoot was beginning to grow normally, but the bulk of the sprayed area had not grown since spraying. Many of the leaves had died completely. Some shoots showed distorted growth and others had the terminal growing

Fig. 79—This block was sprayed in an attempt to control the Johnson grass. Instead, the cane was severely checked and the Johnson grass thrived.

point killed, and showed distorted side-shooting.

The overall picture is that the cane which was not sprayed has continued to grow normally, and is now competing successfully with the Johnson grass. The sprayed cane has been checked so much that it will not produce a reasonable crop; but the spraying has not effectively controlled the Johnson grass which is now out-growing the cane crop.

Poisons

The chemist has assisted cane growers for many years with the formulation of fertilizer mixtures, almost all of which are relatively harmless except for irritation to the nose, throat and lungs when the fine, dusty material is inhaled.

During the past decade or two however, weedicides, fungicides, insecticides and animal poisons have taken an important place in sugar cane agriculture and, while some of these chemicals can be handled and stored without special precautions being taken, others may be regarded as dangerous poisons which, when handled incorrectly, can cause severe pain, illness or death to a careless user.

Almost every poison container gives instructions for the use of the chemical, emphasizing the special precautions which should be observed in its preparation for use. Symptoms of the effects of the poisons are frequently shown, together with antidotes and instructions to be observed in case of poisoning. However, this advice is often not read, or with frequent use, less care is exercised in handling the material.

The storing of poisons on farms is frequently rather haphazard. Tins, suitably labelled, are often found near the farm house or buildings, but after a time the labels become unreadable or lost, and the tin, which may contain a dangerous chemical, is, maybe, discarded in a place where it could result in injury or death to humans or domestic animals. A locked cupboard or room is the safest storage place, and occasional checking to ensure that labels are clearly readable and firmly attached, is recommended.

It would be impossible to list all chemicals used in modern agriculture, but the dangerous nature of some animal poisons such as strychnine, thallium and phosphorus should be well known, while weedicides containing arsenic or PCP are also killers. Each year we hear of cases of severe blistering from mercury based fungicides, while even the widely used BHC can cause irritation to sensitive skin. When dissolving any chemical in water, such as in the preparation of weedicides or fungicides for use, a stick can stir just as effectively as the hand, and injury to the hand can be avoided.

Finally, some readers may consider that a warning such as this is unnecessary, and it would be if:—

(a) Poisons were stored in a safer place.

(b) Labels were read and instructions followed,

and (c) Care taken with all agricultural chemicals whether labelled "poison" or not.

G.A.C.

Planting on Rich Land

By J. H. BUZACOTT

Since the approval of Q.66 for planting on the richer soils of far North Queensland, farmers have come to appreciate the value of a variety which is both resistant to lodging and capable of producing a reasonable sugar content even when growing rapidly. The 1959 harvest has shown that even with such a variety farmers with rich land can get into a lot of trouble some, at least, of which can be avoided by a careful consideration of the problem. In most instances the rich lands which require the services of a variety such as Q.66 represent only a portion of an individual farm and, since it is most difficult to harvest a payable crop from this particular area, a little extra attention to certain details might make all the difference between a handsome profit and a substantial loss.

The crop should be planted as early as possible after the autumn planting period. Planting in April or May would probably result in too lush a crop which would attain such a size that nothing would keep it from lodging. In any event the Q.66 type of land is usually flooded and it is seldom possible to plant before June; however every effort should be made to plant in June or July—certainly not later than August. There is a tendency by some farmers to delay until later with a view to producing shorter stalks with less likelihood of lodging. This, however, is usually not the result. Stooling is better in earlier planted cane and the length of stalk is reduced because the growth is shared by a greater number of stalks. Also the larger number of stalks per stool tend to be self supporting and, accordingly, more resistant to lodging. Late planted cane grows rapidly in the early stages, stools less, and tends to produce spindly stalks which lodge

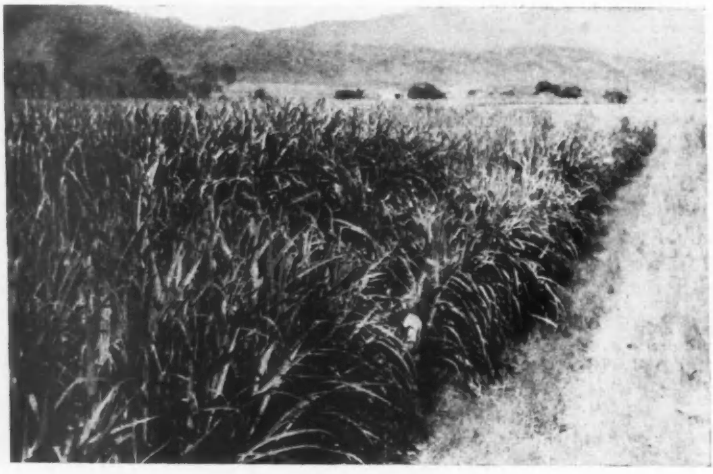


Fig. 80—A rich land variety trial at Meringa, 1960.
—Photo J. H. Buzacott

easily. Furthermore, very late planted cane is liable to suffer severe damage on flooded land as it is a well known fact that the taller cane is, when subjected to flooding, the less damage it will suffer. Q.66 is a good germinator and with the assistance of Aretan there is no reason why plantings in June or July should not result in a good strike.

With regard to harvesting on rich land, many farmers again make a mistake by harvesting the crop too late. The writer is of the opinion that it is usually better to harvest hybrid canes on rich land early in the season, because they tend to sucker in the spring and these suckers can be an important factor in lowering the sugar content if harvest is left too late. The variety Q.57 suckers very heavily on rich land and it should always be harvested as early as possible when growing under these conditions if the sugar content permits at that time. Q.66 does not sucker nearly as badly as Q.57 but in some crops left standing last year till the end of the season some heavy suckering was observed. This was probably due to the fact that several floods earlier in the year washed much of the trash away from the base of the stools. In order to avoid the losses incurred from suckering, early harvest is desirable on rich land. But there are also other reasons in favour of this practice. For instance, early in the season the ratio of the sugar content of Q.66 on rich land to mill average is probably as good as, or better than, it will be later in the season when it commences to grow rapidly again. Also, if the cane is harvested early, the ratoons are more flood resistant and can be harvested early in the following year, whereas if the cane is late cut it implies late harvest in the following year with the attendant risk once more of suckering in the spring. And finally, a further important argument in favour of early harvest is that no varieties in the world are highly resistant to spring lodging if they are well grown and wet windy weather should develop at that time of the year. Attention to these particular points in the planting and harvest of Q.66 on rich land could pay dividends to a few farmers who have not obtained the results expected from planting this variety.

The variety Q.67 was approved for planting in some mill areas in far North Queensland in 1960 as an alternative rich land cane. Although it is not as resistant to lodging as Q.66, it is more resistant than Trojan and has a higher sugar content early in the season than that variety. Although Q.67 has been tested widely in the Burdekin district it was approved in the far north at an earlier stage in the testing programme than usual. This was due to the intense disease susceptibility of Q.66 and the desire to provide an alternative for that variety as soon as possible. It now seems that Q.67 will not be as useful as was hoped in this respect because it has proved very susceptible to top rot in the far north and its ratooning capabilities leave much to be desired. Accordingly farmers with rich land will be well advised to plant Q.67 with caution and will probably achieve better results by concentrating on Q.66. This implies that they must continue to exercise the greatest care in maintaining a disease-free source of supply of Q.66 for planting purposes.

For the future, every attempt is being made to develop lodging-resistant varieties to supplement or replace Q.66 as soon as possible. The project has become an integral part of the cane breeding programme and with the increased rate of selection of lodging-resistant types it is expected that a number of useful varieties of the required type will be developed in the next few years.

Soil Improvement

By C. G. STORY

Results of previous work indicate that bagasse may be used successfully to improve the physical condition of many of the intractable, heavier soils of the low-lying areas in the Mackay district. Approximately 18 acres on the southern portion of the Mackay Experiment Station falls within this category, and, during 1959, a programme was instituted to improve the physical condition of this soil with bagasse and rotary filter mud.

Four acres on the southern half of two blocks received a blanket application of bagasse at 40 tons per acre. However, the delivery of the materials was such that, whereas half the area had been treated with 80 tons of filter mud per acre before the bagasse application, the other half had the mud applied on top of the bagasse. Cane stools were still in the ground, following the harvesting of a second ratoon crop.

Application of the rotary filter mud by a motor vehicle with a mechanical spreading device was rapid, effective and cheap. The most effective method of ploughing out the old stools and incorporating the bagasse filter-mud mixture was by means of a single-furrow, mouldboard plough. A multiple disc plough would not handle the wet mud-bagasse blanket effectively, as the discs tended to ride on the bagasse. The disc plough gave reasonable results on a portion of the area which had been ploughed out and disced prior to the mud and bagasse application, but a number of areas of free bagasse were left on the surface.

Fig. 81—Spreading rotary filter mud on top of bagasse at the Mackay Experiment Station.
—Photo C. G. Story

Inoculated cowpea seed was sown on the area, at the rate of 20 lb. per acre, and disced on the 19th November, 1959. A good germination resulted, except on areas of free bagasse, where the resultant stand was thinner. Grass emergence was restricted

on treated areas, in comparison with untreated portions of the block, until the heavy January rainfall, but areas of free bagasse remained bare. The legume crop was yellow in colour in December, 1959, with odd patches showing a dark green colour where roots had contacted the rotary filter mud. However, by the middle of January the majority of the legume had produced a vigorous dark green crop with an extensive, well-nodulated root system. The results of inundation following heavy rainfall in mid-January killed the legume on portions of the block, and grass replaced this, except on small areas blanketed by free bagasse.

The area will remain uncultivated until at least June, 1960, when land preparation will result in further incorporation of the bagasse and filter mud with the soil. If successful in improving the physical condition of this particular area, the treatment will enable the ultimate utilisation of this land as a more satisfactory site for experimentation.

Fig. 82—Unloading bagasse at the Experiment Station. Application rate is 40 tons per acre.
—Photo C. G. Story

A Fact About Sugar

Sugar cane produces energy more economically than any other crop. One acre of sugar cane will produce eight million calories, or roughly enough to support eight men for one year.

The Herbert River Story

By O. W. D. MYATT

The early history and subsequent development of the rich cane lands of the Herbert River District is closely linked with the name of George Elphinstone Dalrymple. It is therefore of interest to record that the Ingham unit of the 31st Battalion C.M.F., in conjunction with Cardwell's Centenary Year Celebrations, retraced the long forgotten hinterland road from Cardwell to the Valley of Lagoons, on the 17th October last. This historic road, unused since the turn of the century, was surveyed and built under the direction of Dalrymple in 1864 and it is fitting that this epic feat was commemorated, during the recrossing of the track, by the unveiling of a plaque on the 'Gap' site of the road.

Fig. 83—This plaque was unveiled by the Federal Member for Herbert, Major John Murray.

Born in England in 1826, George Dalrymple first came to Australia as Aide-de-Camp to the then Governor of N.S.W., Sir George Gipps and, at 33 years of age, was caught up in the political life of the colony to become the first Speaker of the Queensland Legislative Assembly, following the separation of Queensland from N.S.W. in 1859.

However, despite his political duties, Dalrymple launched out as an explorer and, in 1861, was commissioned by the first Governor of Queensland, Sir George Bowen, to establish a new settlement at Port Denison. In the following year and in partnership with the Scott Bros., he took up the Valley of Lagoons Station and, by 1862, had explored to the coastal ranges overlooking the Herbert River Valley.

Dalrymple's next venture was as leader of the "Port Hinchinbrook" party which successfully reached Rockingham Bay on the 12th January, 1864, to survey and establish the present town site of Cardwell. By February he had successfully penetrated and

discovered the Herbert River Valley, naming the river after the then Colonial Secretary and later Premier of Queensland, Sir Robert Herbert.

In March of the same year he had commenced the building of the supply road from the Valley of Lagoons to the coast, crossing the Herbert River at a point near the present Abergowrie Settlement. The building of this dray road to Cardwell was actually accomplished by the end of April, 1864. In doing so, Dalrymple had thrown open the Valley of the Herbert and, in his report, stated — "The scrubs of the ranges and rich alluvial flats of the Vale of Herbert and the valleys penetrating the coast range are undoubtedly the best suited for the growth of sugar, cotton and coffee in Queensland."

Within only a few short years his recommendations had been acted on, and sugar cane and cotton were growing in the valley. Today the Herbert River district harvests annually some one and a quarter million tons of sugar cane — indeed a worthy tribute to one of Queensland's first great men.

* All historic data supplied by courtesy of "The Herbert River Express."

A Plant Breeder Passes On

It is with regret that we have recently learnt from the Director of the Mauritius Sugar Research Institute (Dr. P. O. Wiehe) of the death of Mr. A. de Sornay, for many years Plant Breeder at that institution.

Aimée de Sornay was a philosopher and a keen mathematician and his cane breeding work was strongly influenced by these two interests. He was also a pleasant companion, well versed in the history of Mauritius, and an indefatigable walker; the writer spent many hours in his company walking in the late afternoon to the waterfall and coloured sands of Chamarel, round the Pamplemousses Botanic Gardens, or through the Black River Gorges.

Widely known to sugar cane research workers throughout the world, Mr. de Sornay's cheerful countenance will be missed by future visitors to Mauritius and it is to be regretted that he did not live to see the next Congress of the International Society of Sugar Cane Technologists which is to be held in Mauritius for the first time in 1962.

J.H.B.

Sugar Experiment Stations Board

A meeting of the Board will take place at Meringa Sugar Experiment Station on April 5th. The Hon. O. O. Madsen, Minister for Agriculture and Stock, who is Chairman of the Board, will be accompanied by Dr. W. A. T. Summerville, Director General of Agriculture and Stock, and Messrs. J. W. Inverarity and B. Foley, the sugar industry representatives. The Director of Sugar Experiment Stations, Mr. Norman J. King, and the Secretary, Mr. C. C. Horne, will be present at the meeting.

Margarodids — A Long-Lived Insect

By B. E. HITCHCOCK

The presence of Margarodids in Queensland cane fields was first recorded in 1932 but due to pre-occupation of the entomologists with more important problems their life history and pest status has not been investigated until recent years.

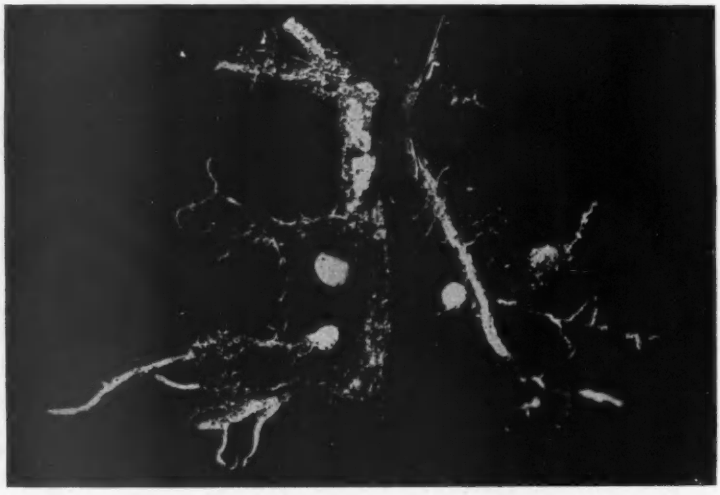


Fig. 84—Earth pearls attached to cane roots.

The form of this insect most commonly seen by farmers is the encysted stage which is known as an "earth pearl" and the term pearl is a very good description of their appearance. On infested cane roots clusters of these cysts may be seen ranging in size up to one-eighth of an inch in diameter and each attached to the roots by a hair-like feeding tube. Sap is absorbed from the roots and the insects mature within the cysts, eventually transforming to six-legged adult females which lay eggs from which the next generation hatches. The young larvae when they emerge from the eggs are extremely minute, six-legged and active. They migrate through the soil and locate suitable roots where they settle down to feed. As feeding progresses the larvae lose their legs, gradually secrete a cyst around themselves and assume the form of the earth pearl stage.

In Queensland cane fields two species have been identified; one of these, *Eumargarodes laingi,* has been found only in the Sarina and Bundaberg districts but the other, at present unnamed, has been recorded from all cane growing areas from Cairns to Bundaberg. Both species are sometimes associated with areas of poor growth in cane fields but whether they are the cause of the poor growth

has not been definitely established.

During life history studies extending over several years it was noted that, whereas *E. laingi* appeared always to complete its life cycle in 12 months, the un-named species sometimes remain encysted for several years even though moisture and root growth appeared optimum for development. Of particular interest was the behaviour of cysts of the latter species which had been kept for periods of up to three years in glass containers without soil. The larger of these cysts were found to contain living adult females and, when the cysts were placed in moist soil, the females laid viable eggs. The smaller cysts contained living larvae at various stages of development and, when these cysts were placed close to cane roots, the larvae extended their feeding tubes and commenced feeding.

Other species occurring overseas have been known to emerge as adult females from cysts which have been kept without soil in glass bottles for as long as fifteen years but this is the first record of encysted larvae recommencing feeding and development after a prolonged period out of their normal environment.

If, in the future, it becomes necessary to institute control measures the persistent cysts of this species may prove a problem, since insecticides will probably be less effective against the protected larvae in the cysts than against the unprotected first stage larvae and adults.

1960 Field Day at Meringa

This annual event will be held at Meringa Sugar Experiment Station on Thursday, April 21st, and it is anticipated that the gathering will be as large and representative as in other years.

On this occasion the Field Day will occur during the currency of the Sugar Cane Technologists' Conference in Cairns, and the agricultural delegates to that conference will have the opportunity of being present at Meringa.

There is always something of new interest at a Field Day—whether it be in the varietal, machinery or cultivation line. All persons with an interest in the industry are invited.

The Sugar Technologists' Conference

This is to be held at Cairns this year, opening on April 20th, and terminating on April 26th.

During the course of the conference there will be three agricultural sessions—on the afternoon of April 20th and on the morning and afternoon of April 22nd.

Cane growers in the Mossman to Babinda area will find much of interest in the various papers to be presented and discussed. The topics range through cane breeding and varieties, chemical weedicides, cane diseases, rat baiting, fertilizing and grub control.

A cordial invitation is issued to all cane growers to be present at one or all of these sessions, which will be held in?

The Varieties Which Produce Our Crop

Queensland's cane industry, which was originally based on varieties imported from other countries, is now principally dependent upon locally bred canes more suited to our environment.

This change has taken place by virtue of the cane breeding activities of the Bureau of Sugar Experiment Stations and the Colonial Sugar Refining Company.

The 1959 crop, harvested for milling in Queensland, totalled 8,427,731 tons of cane. This tonnage was contributed to by 40 approved varieties —as well as a large number of experimental canes in small quantities.

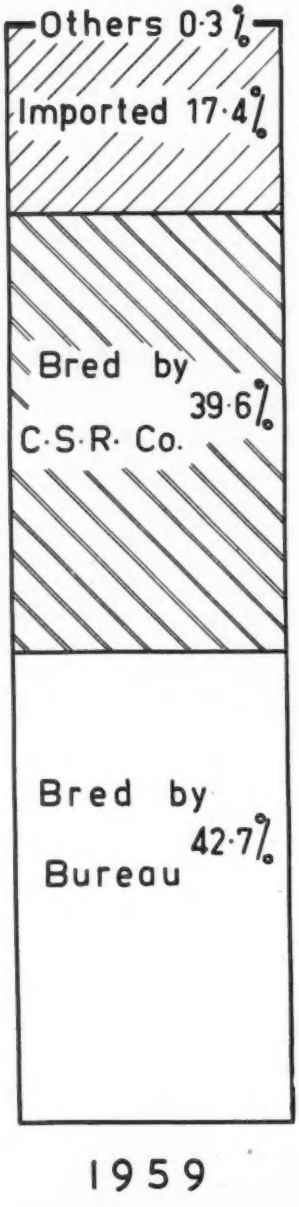
Of the approved varieties five, including Badila, were imported types, 13 were bred by the C.S.R. Co. and 22 were the result of cane breeding by the Bureau.

Of the aggregate tonnage milled in 1959 by the 31 sugar mills in Queensland 42.7 per cent. came from Bureau bred varieties, 39.6 per cent. from C.S.R. bred canes, 17.4 per cent. from imported types, and 0.3 per cent. from experimental plantings.

The diagram shows this source of the crop in illustrated form.

The principal varieties harvested in 1959 were, in order of importance :—

Pindar	1,843,932	tons
Q.50	1,522,682	„
Trojan	1,186,015	„
Q.58	689,896	„
Q.57	626,675	„
N. Co. 310	615,976	„
Badila	527,686	„
C.P. 29/116	304,642	„
Q.63	118,069	„
Q.59	117,844	„
Vidar	114,216	„
Q.61	93,851	„
Q.44	87,952	„
Vesta	67,578	„
Q.47	67,339	„
Q.55	42,700	„
Q.70	38,992	„
Q.68	33,393	„
Q.66	31,323	„



FREE SERVICES TO CANE GROWERS

The Bureau offers the following free services to *all* cane growers in Queensland:—

Soil Analysis and Fertilizer Recommendations

Your soil will be analysed by the most modern methods, and a report will be posted containing a recommendation covering the type of fertilizer required, the amount per acre, the need for lime, and other relevant information. Phone the nearest Bureau office and the soil samples will be taken as soon as possible.

Culture of Green Manure Seed

Cultures and instructions for the inoculation of the seed of cowpeas, velvet beans, mung beans or any other legume will be posted to any cane grower upon request to The Director, Bureau of Sugar Experiment Stations, Brisbane. Allow a week after receipt of your letter for the culture to be prepared and posted, but as the culture will easily keep a month or so it is a good idea to get your culture when you get your seed. If sowing is delayed, ask for another batch of culture; there is no charge.

Advice on All Phases of Cane Growing

The Bureau staff is at the service of all cane growers. They can best advise you on matters pertaining to varieties, fertilizers, diseases, pests, drainage and cultural methods. Bureau officers are available in every major cane growing district. A phone call will ensure a visit to your farm.

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